long-headed African negroes, among whom they dwell, that the small round-headed Negritos of the Indian Ocean do to their larger long-headed Melanesian neighbours. Scattered communities of these small negroes, all much resembling one another in size, appearance and habits, scarcely over four feet in height, and all great hunters, expert with the bow, and living on the produce of the chase, occur at various isolated spots across the great African continent, within a few degrees north and south of the equator, extending from the Atlantic coast almost to the Indian Ocean. In many parts, especially at the west, they are obviously holding their own with difficulty, if not actually disappearing, and there is much about their condition of civilisation and the situations in which they are found, to induce us to look upon them, as in the case of the Bushmen to the south and the Negritos in the east, as the remains of a population which occupied the land before the incoming of the main body of the present natives. If the account of the Nasamonians, related by Herodotus, be accepted as historical, the river they came to, "flowing from west to east," must have been the Niger, and the northward range of the dwarfish people far more extensive twenty-three centuries ago than it is at the present time.

The translator has given, in an appendix, a list of the principal contributions to the literature of the little races of man which have appeared since the publication of the French edition of M. de Quatrefages' book. It would have been still better if he had given some epitome of the considerable advances that have been made in our knowledge of the subject, especially of the recent researches of R. G. Haliburton and Kollmann, which tend to show the former extension of dwarf races over a considerably larger area of the earth's surface than was suspected by our author, such as the whole of North Africa, the Pyrenees, Switzerland, and even Central America.

W. H. Flower.

AN ATTEMPT TO POPULARISE EVOLUTION.

A Primer of Evolution. By Edward Clodd. (Longmans, Green, and Co., 1895.)

THE title of this little book is hardly justified by its contents, since it nowhere defines or explains evolution, or deals with it in a systematic manner. As the author tells us in a prefatory note, the book is an abridgment of his former work, "The Story of Creation"; and he does not appear to have made any attempt to rearrange his materials, or to introduce such new matter as was required to constitute it a real introduction to the theory of evolution for those who know little or nothing about it. Such a book should give, at starting, a full statement of what is meant by evolution in modern science and philosophy; should explain how it differs from previous theories of the universe; and should clearly mark out its range of action and its limitations, showing in what way it is supposed to have "evolved" the material universe, and how much must be postulated as the materials and the forces with which it works.

But instead of any explanation of this nature, the first half of the book is devoted to a general descriptive sketch of the universe, inorganic and organic, so brief and elementary as to be quite unnecessary, since any one prepared to enter on the study of evolution would be already acquainted with so much of the facts to be explained. In all this portion, occupying more than half the book, evolution is not once referred to. Then, in the second part, which is headed "Explanatory," all the ground is gone over again, with explanations which assume evolution, but do not often refer to it. Some of this is interesting and well written, the chapter on "Proofs of Derivation of Species" being one of the best; and if this part had been more fully developed, and had been preceded by such an account of the principle of evolution as has been suggested, the work might have been useful to beginners.

But, besides these deficiencies of arrangement and of subject matter, there are more serious defects in numerous obscurities and misstatements, and in the adoption of very doubtful theories as if they were universally accepted. As examples of these faults, the very first sentence states that—"The universe is made up of matter and motion," as if they were things of the same nature. And on turning to the "explanatory" part, we are informed that the "materials which make up the universe" are "matter and motion." On page 3, we are told that "matter is made up of chemical units or elements," about seventy in number, and that—"These elements are named atoms." On page 91, we have force and energy defined as being respectively "motion which draws the atoms together," and "motion which drives the atoms apart." This appears to have been adopted from a well-known popular writer, but as it is quite different from what is to be found in the usual text-books it should not have been adopted in a "primer." At page 95, the friction of the ethereal medium in retarding the orbital motion of the planets, is stated as if it were a demonstrated fact. The abundance of the compounds of carbon are said to be partly due to its having "an affinity for itself" (p. 102); and among the erroneous statements of fact we are told that, among the lower races the great toe survives "as a grasping organ" (p. 127), and that there are in America certain wandering tribes who use gestures as "the sole mode of communication" (p. 157). Again, without a word of doubt or reservation, we have the statements that—"The origin of life is not a more stupendous problem to solve than the origin of water" (p. 103); and that—"mind is the highest product of the action of motion upon matter (p. 174). These few samples are sufficient to show that this little work requires very careful revision to render it a safe guide for the elementary student.

STEEL AND THE NEW IRON-ALLOYS.

Steel Works Analysis. By J. O. Arnold. (London: Whittaker and Co., 1895.)

CHEMISTS engaged in steel works have long been wanting a trustworthy manual adapted to their special requirements, and this work is the latest attempt to meet the want. The work is undoubtedly an advance on its predecessors, for, while it retains the best of the well-known processes, many newer operations are now, for the first time, published in a comparatively handy form. Everything that a steel works analyst may fairly be called upon to examine, finds a place in this volume.

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This applies more especially, perhaps, to the sections treating on the examination of chrome-iron, silicon-iron, nickel alloys, &c.

The volume is particularly valuable as embodying the results of an extensive experience in the examination of certain iron alloys which are bound to become of special importance in the near future; most steel works analysts will cordially appreciate this portion.

As the results of my own practice, I can confirm the accuracy and efficiency of most of the selected methods; more especially as applied to the assay of ferro-chrome, ferro-aluminium, silicon, nickel, &c.

In regard to the assay of ferro-chrome or steels, Galbraith's method is to be preferred, if the precautions given are adopted. The original process did not always give concordant results. The gravimetric methods are, however, on the whole most trustworthy. Results are apt to be low unless great care is taken; no doubt for the reasons shown at page 207. The estimation of small quantities of aluminium presents difficulties not easily overcome; indeed, simpler and less complicated methods are required: a remark which applies to most of the methods now practised.

The assay processes for sulphur and phosphorus are clearly set forth, leaving practically nothing to be desired. For the former element, certainly, gravimetric estimations are best; but it is nearly impossible to obtain the necessary acids quite free from sulphur compounds: this constitutes a serious drawback, and entails the necessity of a blank experiment, which should be avoided when possible. The evolution methods give only relative results, agreeing pretty closely amongst themselves, but somewhat under those obtained gravimetrically. The author's colour test is a good one, but somewhat complicated. A more simple modification of the colour test consists in passing the evolved H_2S through 50 c.c. of a very dilute lead acetate solution ($\frac{1}{10}$ grm. in litre H_2O) contained in a long test-tube. This is compared with a standard steel, treated in the same manner, containing a known percentage of sulphur. No precipitate is formed, and a clear brown tint is obtained, which lasts for some time, and is easily compared with the standard.

The processes advocated for phosphorus (pp. 110-115) are complete, but the necessary manipulative skill required to carry them out can only be acquired by constant practice. I find, however, that the addition of a little HCl to the nitric acid solution assists the precipitation of phosphorus when precipitating with ammonium molybdate. Further, I agree with the author that in ordinary steels the presence of silicic acid may be ignored: with regard to time, fifteen or twenty minutes is ample; if longer, molybdic acid is precipitated. In addition, even if this does not occur, the precipitate may redissolve to a notable extent. The dried phospho-molybdate precipitate is distinctly soluble in dilute nitric acid.

The author's method of precipitating arsenic with H_2S is good, but no others are given. The process with modifications gives good results, but the ordinary method is preferable when it is desired to estimate this element. For the mere elimination of arsenic from the phosphoric acid, in order to determine the latter, the boiling or distillation process is useful.

It is to be regretted that no trustworthy process has been given for the determination of oxygen in steel. A thorough examination of the whole work, however, reveals the pains taken by the author, not only as regards the portions mentioned in the foregoing, but also in the somewhat less important sections dealing with fuel and other materials. There can be little question that Prof. Arnold has rendered steel-works analysts a decided service by the publication of his work.

JOHN PARRY.

OUR BOOK SHELF.

Wayside and Woodland Blossoms. A Pocket Guide to British Wild Flowers for the Country Rambler. By Edward Step. With coloured figures of 156 species, black and white plates of 22 species, and clear descriptions of 400 species. (London: Frederick Warne and Co., 1895.)

MANY persons who admire the beautiful flowers that adorn our woods and pastures would fain know their names, with a view to further knowledge of them; but for various reasons they are unable to use the ordinary "Flora," however simply compiled. Here is a little book that will meet the wants of such persons, and do more, we believe, to lay the foundation of a sound knowledge of plants than the form in which "life-histories" are taught in ordinary schools and classes for the purpose of passing an examination. In spite of all that is said to the contrary, to know a large number of plants, animals, or minerals by sight, is of more value, to begin with, than a more detailed knowledge of a single, or few, organisms or objects; especially when this detailed knowledge is gained by rote, and not by observation. We therefore commend this little book to the notice of those interested in, and believing in, small beginnings, though the kind of information it contains is not exactly what the examiner demands. The coloured figures are well drawn, and the colouring, although a little crude, is good enough to enable one to recognise the plants the figures are intended to represent. The majority of the common and prominent plants of our native flora are figured. Many of them are drawn of the natural size, whilst others are reduced and a few enlarged, without indications of the reduction or enlargement. These things should be explained for a beginner. The descriptive and explanatory letterpress is instructive, and free from pedantry, by which we mean the display of technical terms only used by "teachers" of botany; not by botanists. There are some inconsistencies in the choice of subjects for illustration. For example, the exceedingly rare *Holosteum umbellatum* is represented, whereas the allied genus *Cerastium*, found in every county, and perhaps in every parish and field in the kingdom, is left out. There is also an unexplainable absence of characteristic sea-side plants. The black and white figures mentioned in the title represent native trees and some of the commonly-planted exotic species. An omission here is the common yew, which might well have taken the place of the very poor figure of *Ailantus*. In spite of the shortcomings indicated, we strongly recommend this little pocket-book to those in search of some practical knowledge of common wild plants.

W. B. H.

The Lepidoptera of the British Islands; a Descriptive Account of the Families, Genera, and Species indigenous to Great Britain and Ireland, their Preparatory States Habits, and Localities. By Charles G. Barrett, F.E.S. Vol. ii. Heterocera, Sphinges, Bombyces. (London: L. Reeve and Co., 1895.)

MR. BARRETT'S great work on British *Lepidoptera* is making steady progress, and we are glad to find that the second volume which includes the Sphinges and the first

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